Hazardous Air Pollutants Modeling "Off-Ramp"

NR 445 Technical Advisory Work Group
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Introduction

- The Threshold Rates Are Established to Insure Air Quality Standards Are Met
- However, Emissions Above Threshold May Still Meet Standards
- This Proposal Would Allow Facilities to Demonstrate Compliance With Standards

Level 1 NR 445 Screen

- Facility Can Demonstrate Compliance If Allowable Emissions are Below Threshold For the Pollutant
- Emissions Regulated by NR 445 at the Facility are Added Together and Compared to Respective Stack Threshold

Level 2 NR 445 Screen

- If Emissions are Above Thresholds, the SCREEN3 Model May Be Used to Demonstrate Compliance
- SCREEN3 Computes Conservative One-Hour Concentrations for Single Sources Using Worst-Case Meteorology

Single Emission Source

- The Stack is Modeled With Allowable Emission Rate and Actual Physical Parameters
- If Concentration is Less Than Standard, Source is in Compliance

Single Source Example

- 35 foot Stack Height
- 2.52 foot Stack Diameter
- 11,300 acfm Flow Rate
- 350 degrees F Temperature
- 22 foot Building Height
- 354 foot Building Width

Single Source Example

- Stack Emission Rate = 4.20 #/hr Chlorine
- Threshold = 0.303 #/hr
- SCREEN3 Result = 75.4 µg/m^3 - One Hour
- Multiply Result by 0.4 Scaling Factor
- 24 Hour Result = 30.2 µg/m^3
- ISCST3 Result = 29.3 µg/m^3
- Standard = 35.0 µg/m^3

Multiple Source Example

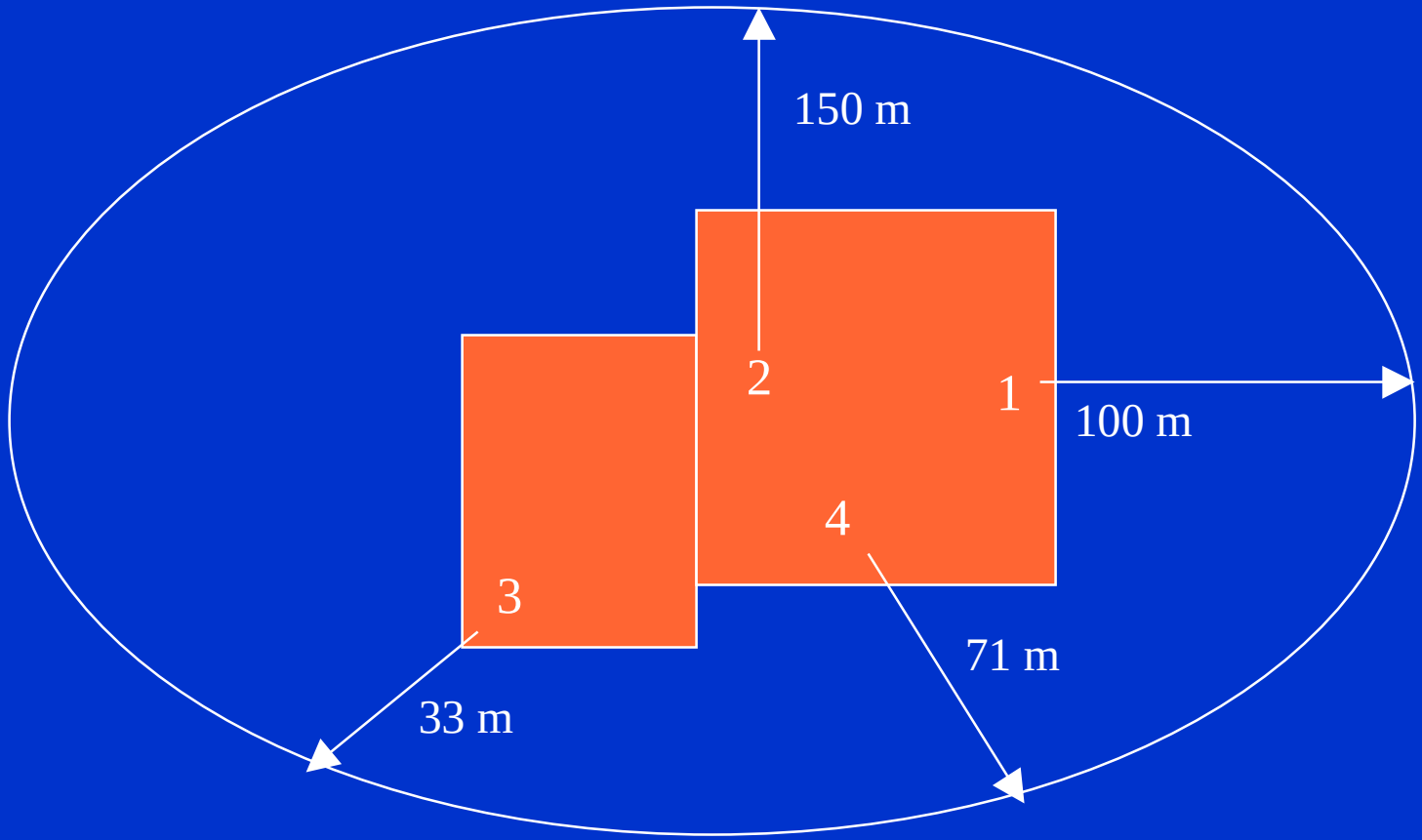
- Four Stacks (22', 36', 53', 70')
- Total Ammonia Emissions - 11.7 #/hr
- Threshold for Short Stack - 0.078 #/hr
- Threshold for Medium Stack - 0.303 #/hr

Multiple Source Example

- Stack 1 - 36'high, 1.2#/hr NH_4, 328'to Fence
- Stack 2 - 53'high, 2.0#/hr NH_4,492'to Fence
- Stack 3 - 70'high, 8.0#/hr NH_4, 108'to Fence
- Stack 4 - 22'high, 0.5#/hr NH_4, 233'to Fence

- Schematic of Plot Plan on Next Slide

Multiple Source Example

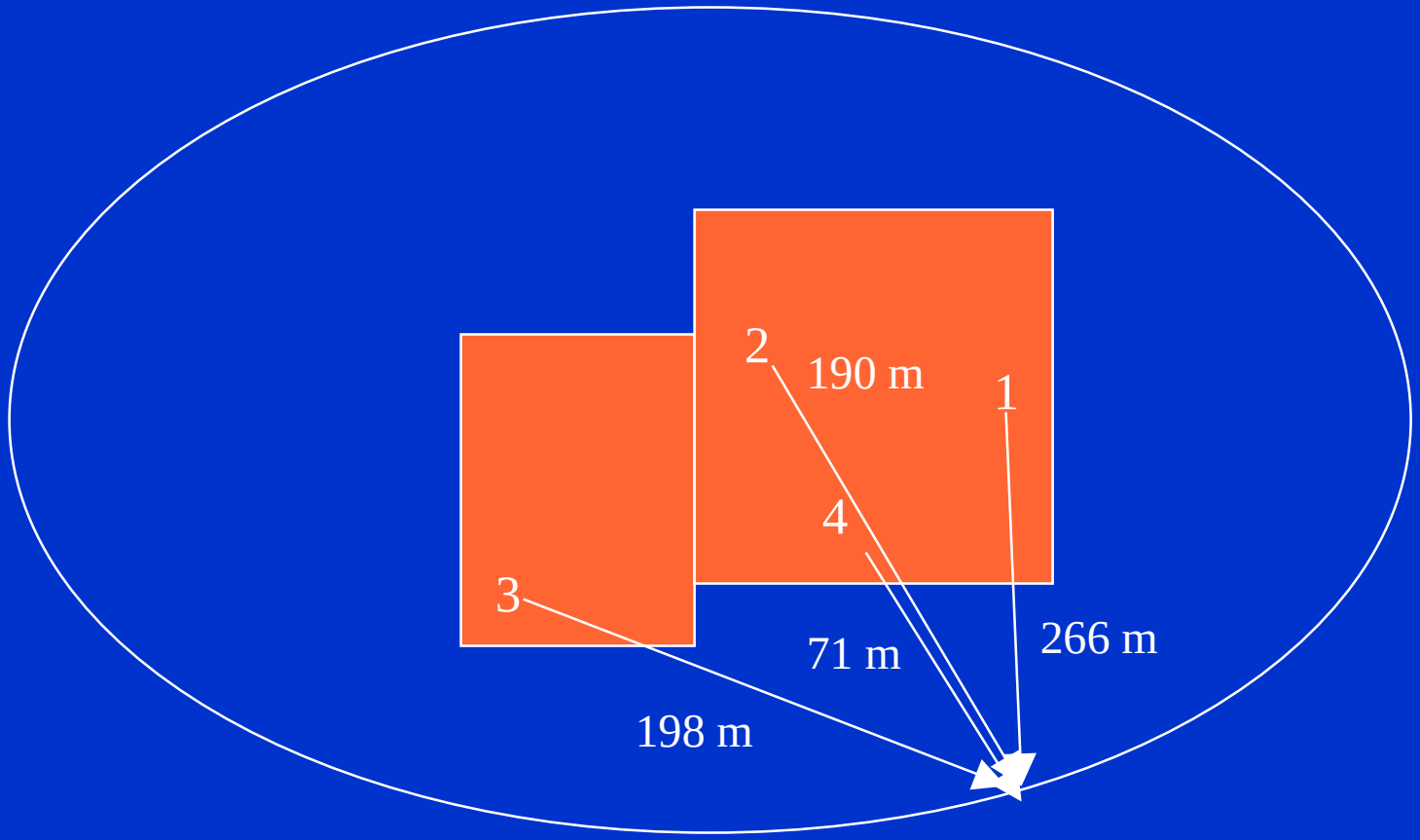


Multiple Source Example

- SCREEN3 Results:

- Stack 1 - 147.5 µg/m^3 (at 100 meters)
- Stack 2 - 87.6 µg/m^3 (at 150 meters)
- Stack 3 - 32.4 µg/m^3 (at 200 meters)
- Stack 4 - 449.8 µg/m^3 (at 71 meters)

Multiple Source Example



Multiple Source Example

- SCREEN3 Results:
- Stack 1 - 60.7 µg/m^3 (at 190 meters)
- Stack 2 - 57.0 µg/m^3 (at 266 meters)
- Stack 3 - 32.4 µg/m^3 (at 198 meters)
- Stack 4 - 449.8 µg/m^3 (at 71 meters)

- Total Concentration - 599.9 µg/m^3

Multiple Source Example

- Total Concentration - 599.9 µg/m^3
- Multiply by 0.4 Scale Factor - 240.0 µg/m^3
  - ➡ Scale Factor-Conversion From 1 to 24 Hours
- Ammonia Standard - 418.0 µg/m^3
- Regulatory Action Not Required

- Analysis with ISCST3 - Result - 30.7 µg/m^3